

**Testimony of Professor Dan Sperling to Massachusetts Advanced Biofuels Task Force, 1/17/08  
University of California-Davis, Director of Institute of Transportation Studies; member,  
California Air Resources Board (CARB)**

Working with CA on low-carbon fuels standard  
30 years work on alternative fuels. Advise industry.

**3 messages, 1 recommendation:**

1. Many fuel choices; Biofuels, electricity (plug-in hybrid or electric vehicles), hydrogen  
Biofuel feedstocks can be made into many liquids and gases.
2. Very uncertain how big role of biofuels will be. None of the attractive biofuels are ready to be commercialized yet. Many biofuels have large environmental impacts.
3. The GHG impact of any crops that are farmed may be negative. Waste materials are probably going to become more attractive. It would be foolish to predict which fuels are going to be the best in the future.

**Important understandings:**

1<sup>st</sup> generation options: corn ethanol, soy biodiesel, palm oil.  
Very expensive, no air quality benefits. Little or no GHG benefits  
Corn and Soy most experts would say do not make sense except as a transition fuel.

It's most likely that the biofuel of the future will not be ethanol, but will be a molecule more similar to gasoline or diesel.

3<sup>rd</sup> generation biofuels – research going on, but too early.

**2 major uncertainties:**

Techniques for biofuels from cellulose still not resolved.

Harvested crops – might be rejected for use in making fuels.  
Only attractive fuels might be from waste residues.

E85 might never happen. My sense is that it probably won't. Oil companies don't want to push this.

**A good state based fuels policy – 6 features:**

1. Don't try to pick winners – mandates are a bad idea – too many uncertainties about tech, econ etc.
2. Incentives should be performance based
3. Must use a lifecycle analysis approach – volume based measures are not a good idea
4. Need to be stimulating innovation – what's proven is not attractive, what's unproven is potentially attractive
5. Need to be creating a durable framework – mammoth investments, companies need security that policies and programs aren't going to change quickly.
6. None of us are islands. Create rules that are consistent across states, with the EU with the Federal govt.

**Recommendation:**

Something like a low-carbon fuel standard in CA is the way to go. Low life-cycle emissions costs. EU doing something very similar. Many US states, and 3 Canadian provinces.

It includes all fuels. Not clear how it's going to play out or how large its going to be.

Regulating in CA the oil companies and refineries. Talking to NESCAUM to coordinate in NorthEast. Can be integrated with a carbon cap or a carbon tax.

Complementary policies are also needed. LCFS works well with liquid fuels. Biofuels can more or less fit into existing infrastructure. Electricity and hydrogen will need more support to be integrated into transportation.

### **Questions from task force**

Energy and Environmental Affairs Secretary Ian Bowles – Point about repurposing waste. Gasified waste - \$/gallon better use in liquid fuels vs electricity. Waste to biofuels technologies.

Question about what is highest use of biofuels? Lots of options to create electricity from biofuels, problem of finding choices for transportation fuels sector.

MSW is diverse feedstock so creating fuels from this is a challenge.

As farmed crops become more problematic – adds value to using waste for something productive.

Senator Pam Resor – CA moving towards a Carbon tax?

CA law requires GHG reduced back to 1990 by 2020 (20% below BAU) CA developing plans now. Might expect a multi-sector cap and trade program. Carbon tax might seem attractive once people begin to

Mascoma representative – annuals vs. perennials, perennial crops could sequester carbon?

Simple explanation – a lot of carbon sequestered in soils. Bringing new land into production somewhere by using land of biofuels. That marginal acre of land – conversion of prairie land, or rainforest – soils with perennials that have been sequestering carbon for a long time. Studies are showing corn ethanol adding 20% GHG probably at best corn ethanol is not better than gasoline, or worse.

Cellolosic ethanol benefits probably substantially worse than projected 60-80% improvement, but probably better than gasoline.

Ian Bowles – technology neutral suggestions?

New energy bill specifically excludes MSW. Fuel suppliers are going to have less of an incentive.

Assistant Secretary David Cash – Access and use sustainably grown and harvested low quality wood.

A good option. Unequivocally a good idea, but the volume that you get out of it might not be huge. Maybe if we pursue several waste streams it might add up. Economics are difficult because it's a dispersed resource. Creating the right incentives can really make a big difference.